NiceZyme View of ENZYME: EC 1.6.3.1

Official Name

NAD(P)H oxidase.

Alternative Name(s)

Dual oxidase.

ThOX.

THOX2.

Thyroid NADPH oxidase.

Thyroid oxidase.

Thyroid oxidase 2.

Reaction catalysed

NAD(P)H + O(2) <=> NAD(P)(+) + H(2)O(2)

Cofactor(s)

FAD; Heme; Calcium.

Comment(s)

- When calcium is present, this transmembrane glycoprotein generates H(2)O(2) by transfering electrons from intracellular NAD(P)H to extracellular molecular oxygen.
- The electron bridge within the enzyme contains one molecule of FAD and probably two heme groups.
- This flavoprotein is expressed at the apical membrane of thyrocytes, and provides H(2)O(2) fc the thyroid peroxidase-catalyzed biosynthesis of thyroid hormones.

Human Genetic Disease(s)

Congenital hypothyroidism	MIM:607200

Cross-references

BRENDA	1.6.3.1
PUMA2	1.6.3.1
PRIAM enzyme-specific profiles	1.6.3.1
Kyoto University LIGAND chemical database	1.6.3.1
IUBMB Enzyme Nomenclature	1.6.3.1
IntEnz	1.6.3.1
MEDLINE	Find literature relating to 1.6.3.1

View entry in original ENZYME format

All ENZYME / UniProtKB/Swiss-Prot entries corresponding to 1.6.3.-

KEGG ENZYME: 1.6.3.1

Help

Entry EC 1.6.3.1 Enzyme

Name NAD(P)H oxidase;
THOX2;
ThOX;
dual oxidase;
p138tox;
thyroid NADPH oxidase;
thyroid oxidase;
thyroid oxidase 2;
NADPH oxidase

Class Oxidoreductases
Acting on NADH or NADPH
With oxygen as acceptor

Sysname NAD(P)H:oxygen oxidoreductase

Reaction NAD(P)H + H+ + O2 = NAD(P)+ + H2O2

Substrate NADH [CPD:C00004]
NADPH [CPD:C00005]
H+ [CPD:C00080]
O2 [CPD:C00007]

Product NAD+ [CPD:C00003]
NADP+ [CPD:C00006]
H2O2 [CPD:C00027]

Comment Requires FAD, heme and calcium. When calcium is present, this transmembrane glycoprotein generates H2O2 by transfering electrons from intracellular NAD(P)H to extracellular molecular oxygen. The electron bridge within the enzyme contains one molecule of FAD and probably two heme groups. This flavoprotein is expressed at the apical membrane of thyrocytes, and provides H2O2 for the thyroid peroxidase-catalysed biosynthesis of thyroid hormones.

Reference

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Moreno JC, Bikker H, Kempers MJ, van Trotsenburg AS, Baas F, de Vijlder JJ, Vulsma T, Ris-Stalpers C.
Inactivating mutations in the gene for thyroid oxidase 2 (THOX2) and congenital hypothyroidism.
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2 [PMID:11822874]
De Deken X, Wang D, Dumont JE, Miot F.
Characterization of ThOX proteins as components of the thyroid H(2)O(2)-generating system.
Exp. Cell. Res. 273 (2002) 187-96.
3 [PMID:10806195]
De Deken X, Wang D, Many MC, Costagliola S, Libert F, Vassart G, Dumont JE, Miot F.
Cloning of two human thyroid cDNAs encoding new members of the NADPH oxidase family.
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Purification of a novel flavoprotein involved in the thyroid NADPH oxidase. Cloning of the porcine and human cdnas.

J. Biol. Chem. 274 (1999) 37265-9.
5 [PMID:10401672]
Leseney AM, Deme D, Legue O, Ohayon R, Chanson P, Sales JP, Pires de Carvalho D, Dupuy C, Virion A.
Biochemical characterization of a Ca2+/NAD(P)H-dependent H2O2 generator in human thyroid tissue.
Biochimie. 81 (1999) 373-80.
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Dupuy C, Virion A, Ohayon R, Kaniewski J, Deme D, Pommier J.
Mechanism of hydrogen peroxide formation catalyzed by NADPH oxidase in thyroid plasma membrane.
J. Biol. Chem. 266 (1991) 3739-43.

Other DBs IUBMB Enzyme Nomenclature: 1.6.3.1
ExPASy - ENZYME nomenclature database: 1.6.3.1
ERGO genome analysis and discovery system: 1.6.3.1
BRENDA, the Enzyme Database: 1.6.3.1

LinkDB All DBs

=> Original format

DBGET integrated database retrieval system, GenomeNet